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(54) Tennis racket string, its manufacture and use in stringing a tennis racket

In a tennis racket string (1) having an elastic core coated with plastic, the core (2) is comprised of twisted wire or fiber material, particularly of twisted steel wire. The core (2) may also be totally or partially comprised of twisted glass fibers or carbon fibers. The core (2) is preferably coated with a protective coating (3) of fluorocarbon resin, particularly polytetrafluoroethylene or fluoroethylene propylene. This tennis racket string (1) or the racket stringing produced with it is distinguished on the one hand by high elasticity, tensile strength and impact resistance and very good ball acceleration and on the other hand by complete indifference to weather, whereby the fluorocarbon protective coating (3) has an extremely low coefficient of friction and is free from brittleness, cracking and fraying.

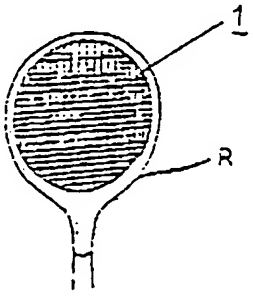

Fig. 1

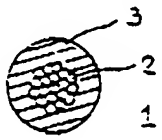

Fig. 2

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Claims

1. Tennis racket string having an elastic core coated with plastic, characterized by the fact that the core (2) is comprised of twisted wire or fiber material.

2. Tennis racket string in accordance with Claim 1, characterized by the fact that the core (2) is comprised of twisted steel wire.

3. Tennis racket string in accordance with Claim 1, characterized by the fact that the core (2) is entirely or partially comprised of glass fibers or carbon fibers.

4. Tennis racket string in accordance with any of Claims 1 to 3, characterized by the fact that that the core (2) is coated with a protective coating (3) of fluorocarbon resin, particularly polytetrafluoroethylene or fluoroethylene propylene or a copolymer of ethylene and tetrafluoroethylene.

5. Process for the manufacture of a tennis racket string in accordance with any of Claims 1 to 4, characterized by the fact that the plastic is applied to a core of twisted wire or fiber material in a molten state.

6. Process in accordance with Claim 5, characterized by the fact that a molten fluorocarbon resin such as polytetrafluoroethylene or fluoroethylene propylene or ethylene tetrafluoroethylene copolymerisate is applied to the core at temperatures ranging from 300 to 405°C.

7. Use of a tennis racket string in accordance with any of Claims 1 to 4 for stringing a tennis racket.

8. Stringing a tennis racket with a tennis racket string comprised of an elastic core coated with plastic,
characterized by the fact that
the core (2) of the tennis racket string (1) is comprised of twisted wire or fiber material, particularly steel wire or glass fiber or carbon fiber material and is coated with a protective coating (3) of fluorocarbon resin, particularly polytetrafluoroethylene or fluoroethylene propylene or ethylene tetrafluoroethylene copolymerisate.

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Tennis racket string, its manufacture and use in stringing a tennis racket

The invention relates to a tennis racket string, a process for its manufacture and the stringing of a tennis racket with it.

As long as the sport of tennis has existed, there has been the problem of stringing. Up to now, there have been primarily two types of stringing material, i.e., gut strings and plastic strings. The primary qualities that a tennis racket string should possess are elasticity, high ball acceleration, ease of play and long life.

The previously used and generally well-known gut strings do indeed have the required characteristics of elasticity, ball acceleration and ease of play; however, they have the very great disadvantage that a long life is not assured and on the other hand, they are very dependent on weather conditions, i.e., play can take place only in completely dry weather. The gut string is very sensitive even to a noticeable humidity, not to speak of rain; in such conditions it frays and tears very quickly, which is experienced by the players as a very great disadvantage due to the relatively high cost price.

The attempt to reduce the above-cited disadvantage by a plastic coating of the gut string is well known. However, it is just as well known that a thin coating wears away very quickly, while a thicker coating severely impairs and reduces the quality of the gut string with respect to elasticity and ball acceleration.

The attempt to compensate for the disadvantage of the gut string by jacketing a steel wire with a plastic is also well known. This structure has not proven successful by virtue of the fact that for one thing, the connection between the steel wire and the plastic jacket did not stand up to the high stress of stringing and secondly, the necessary elasticity was no longer present if the stringing was done with less tension.

In contrast to the gut string, the plastic string has a longer life, is not dependent on weather and has a lower price; however, it lacks the major qualities desired in a tennis racket string, namely good elasticity and high ball acceleration.

The objective of the invention is to develop a tennis racket string optimally combining the desired qualities, i.e., elasticity, high ball acceleration and ease of play with indifference to weather and a life comparable or superior to that of the plastic string, and a process for the manufacture of such a tennis racket string as well as its use.

The subject matter of the invention by which this objective is to be attained is a tennis racket string having an elastic core coated with plastic with the distinguishing feature that the core is comprised of twisted wire or fiber material.

Preferably, the core is comprised of twisted steel wire.

Additional possibilities provide for the core to be comprised entirely or partially of twisted glass fibers or carbon fibers.

In a further development of the invention, the plastic protective coating of the tennis racket string is comprised of a fluorocarbon resin, particularly polytetrafluoroethylene or fluoroethylene propylene or an ethylene tetrafluoroethylene copolymer.

The manufacture of the tennis racket string in accordance with the invention preferably takes place by the application of the molten plastic onto the core of twisted wire or fiber material.

In the case of the plastic protective coating of a fluorocarbon resin such as polytetrafluoroethylene or fluoroethylene propylene or ethylene tetrafluoroethylene copolymerisate, the protective coating is advantageously applied at temperatures ranging from 300 to 450°C.

The tennis racket string in accordance with the invention can be used advantageously in stringing a tennis racket.

This stringing has the following qualities: By virtue of the core of the string of twisted material, particularly twisted steel wire, it has high elasticity, tensile strength and impact resistance and very good ball acceleration and, owing to the plastic jacket which is very well anchored to the core, it is at the same time totally indifferent to the weather. If a fluorocarbon resin such as polytetrafluoroethylene or fluoroethylene propylene or ethylene tetrafluoroethylene copolymerisate is used as the plastic, then the tennis racket string or the stringing of a tennis racket produced with it will also possess good impact resistance and flexural strength in the coating layer and a favorable, extremely low coefficient of friction, and the protective coating is free from brittleness, cracking and fraying.

The combination of core and jacket of the tennis racket string in accordance with the invention is very stable and withstands any amount of tension when the tennis racket is strung.

While the previously customary tennis racket strings have a diameter of 1.2 to 1.5 mm, a diameter of 1.0 to 1.2 mm is sufficient for the tennis racket string in accordance with the invention, of which in the case of the 1.2 mm thick tennis racket string, approximately 0.76 mm, for example, is taken up by the diameter of the twisted steel wire core. Based on the diameter which can be reduced in comparison with the customary tennis racket strings, the weight of the stringing can be held in the customary range in the case of the twisted steel wire core, and in addition increased elasticity and maximum ball acceleration are achieved.

The invention will now be described in greater detail with reference to the exemplary embodiment illustrated in the drawings in which:

Figure 1 shows the stringing of a tennis racket and
Figure 2 shows a cross-section of a tennis racket string used to produce the stringing shown in Figure 1 in enlarged scale.

The racket frame with the stringing in accordance with the invention using tennis racket string 1 can be seen in Figure 1.

According to Figure 2, this tennis racket string 1 is comprised of a core of twisted steel wire 2 of, for instance, nineteen single wires, which twisted steel wire 2 is coated with a polytetrafluoroethylene protective coating 3 having a smooth surface. By way of example, steel wire 2 has a diameter of 0.76 mm while the total diameter of tennis string 1 is 1.2. mm, which means the layer thickness of the polytetrafluroethylene protective coating 3 is 0.22 mm.

However, the invention is not limited to these dimensions and materials of the shown exemplary embodiment. Thus, for instance, the core could have a diameter of 0.62 mm and the coated string 1 could have a diameter of 1.00 mm, whereby fewer than 19 wires could form the core and the elasticity of the stringing can be regulated.